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DRAFT SAT Evaluation of Proposed MPA Packages

I. Background

Six packages of MPAs were submitted by the MLPA Initiative Staff to the SAT for their evaluation on 15 December 2005. The relative amount of protection afforded to habitats in the study region was evaluated for five of these packages (i.e., packages 0, 1, 2, 3, and AC). The SAT did not evaluate package B because it did not address goal 6 of the MLPA and related network provisions of the Master Plan Framework (i.e., size and shape guidelines). The SAT also noted that the single large proposed state marine reserve in package B would be assigned a low level of protection (i.e., SMCA-Low; see relevant discussion below) because commercial kelp leases exist within this MPA. Evaluation of the effects of the proposed MPA would not be possible without sites of comparable habitat outside an MPA. Thus, the single large ubiquitous MPA preempts evaluation. Additionally, the scientific study of relative impacts of fishing and other extractive activities among MPAs with various levels of protection is not possible within a configuration of a single MPA, which is the case in package B.

Most of the five packages included information on rationale, regulations, area, habitats, species likely to be protected, boundaries, and goals for each proposed MPA. For each MPA in each of these packages, MLPA Initiative Staff provided estimates of length of shoreline (linear mile) for sandy/gravel beach, rocky intertidal, coastal marsh, tidal flat, and surfgrass habitats and area (mi²) of eelgrass, estuarine, soft sediment (0-30, 30-100, 100-200, >200 m), rock (0-30, 30-100, 100-200, >200 m), kelp, and canyon (0-30, 30-100, 100-200, >200 m) habitats. Areal kelp coverage was averaged from 1989, 1999, 2002, and 2003. The SAT did not consider pinnacle habitats in this evaluation because of poor data quality (i.e., many pinnacles were not identified in these data sets and therefore it was impossible to accurately estimate percentage of available habitat type being protected). **[NOTE: Comments on headlands and upwelling centers to come.]**

Data that were used in this SAT evaluation were estimated from a geographic information system (GIS), which is an extremely valuable tool. However, errors in the estimates from the GIS exist because of the large number of data sources and the wide range in quantity and quality of data. An example of the limitations of these data is that the GIS analysis suggests that some of the proposed MPAs comprise completely soft sediment, whereas rocky habitats are known to occur within those MPAs. The SAT suggests that the overall approach to protection of habitats, replications, and distribution (size and spacing) is more relevant than the actual amount of a particular habitat found in a proposed MPA, because the same data set was used for all packages.

The SAT recognized that the distribution and abundance of the various habitat types are not uniform throughout the central coast study region. Therefore, to evaluate the proposed packages relative to MLPA Goal 4, the study region was divided into seven sub-regions, from north to south: Pigeon Point-Capitola; Capitola-Monterey Breakwater; Monterey Breakwater-Point Sur; Point Sur-San Martin; San Martin-Point Estero; Point Estero-Santa Marine River; and Santa Maria River-Point Conception (Figure 1). These subregions were delineated by comparable length of coastline and by clusters of proposed MPAs. An evaluation of representation of

habitats within each MPA relative to availability of habitats at a smaller spatial scale (i.e., subregions) was more relevant than an analysis relative to the entire study region. Additionally, network functionality of the packages (goal 6) is better evaluated at the sub-regional spatial scale rather than across the entire study region. Percentage of available habitat in each habitat type was estimated for each of the seven subregions as well as for the entire study region (Figure 2).

II. Categories of Protection Level of Proposed MPAs

The SAT categorized each MPA in each of the five packages by their relative level of protection (see Appendix 1a-e for SAT rationale of level of protection for each MPA in each package).

Why categorize MPAs by levels of protection? The Marine Life Protection Act (MLPA) identifies three types of Marine Protected Areas (MPA): State Marine Reserves (SMR), State Marine Conservation Areas (SMCA), and State Marine Parks (SMP). There is great variation in the type and magnitude of activities that may be permitted within these MPAs, in particular SMPs and SMCAs. This variety purposely provides designers of MPA packages with flexibility in proposing MPAs that either individually or collectively fulfill the various goals and objectives specified in the MLPA. However, this flexibility can result in complex and possibly confusing levels of protection afforded by any individual MPA or collection of MPAs. In particular, SMCAs allow for many possible combinations of recreational and commercial extractive activities. Therefore, MPA proposals with similar numbers and sizes of SMCAs may in fact differ markedly in the type, degree, and distribution of protection throughout the study region. Thus, the purpose of categorizing MPAs by their relative level of protection is to simplify comparisons of the overall conservation value of MPAs within and among proposed packages.

Rationale for categories of protection. The SAT is evaluating the MPA proposals particularly with respect to five MLPA goals: 1, 2, 3, 4, and 6. **Goal 1** addresses protection of the natural diversity and abundance of marine life, and the structure, function, and integrity of marine ecosystems. **Goal 2** aims to help sustain, conserve, and protect marine life populations, including those of economic value, and rebuild those that are depleted. One aspect of **Goal 3** that the SAT will evaluate is the opportunity to study marine ecosystems that are subject to minimal human disturbances. The SAT specifically will evaluate these proposals with respect to the replication of appropriate MPA designations, habitats, and control areas. **Goal 4** pertains to the protection of marine natural heritage, including protection of representative and unique marine life habitats in central California waters. **Goal 6** aims to ensure that the central coast's MPAs are designed and managed, to the extent possible, as a component of a statewide network.

The likelihood that any particular MPA or collection of MPAs will meet any of these five goals is based in large part on the type and magnitude of removal or mortality (collectively referred to as "take") of living marine resources that occurs within the MPAs. Three forms of take include (1) direct removal of a species from an MPA, (2) unintended incidental removal of a species in the process of targeting another species (referred to as "bycatch"), and (3) perturbation of the ecosystem in such a way that it leads to increased mortality of a species (e.g., alteration of habitat that leads to reduced refuge from predators). Take is not limited to fishing activities. For example, coastal power generating stations impinge fishes and invertebrates and entrain their larvae in the process of drawing ocean water for cooling systems. Likewise, many minor

seawater intakes and sewage outfalls occur along the coast. The impacts of seawater intakes and sewage outfalls can be diffuse in nature, and can affect ecosystems both locally and regionally. The extent of these impacts is largely unknown. At Diablo Canyon Power Generating Station, in particular, differences in adult populations due to intake effects have not been detected. Therefore, the SAT is not including an evaluation of these potential sources of impacts on individual MPAs. Additionally, commercial kelp harvest can reduce habitat availability and may directly and indirectly increase mortality of juvenile fishes. Thus, the level of protection and conservation value afforded by any particular MPA depends very much on the type and magnitude of fishing and other human activities that will be allowed within the marine protected areas.

State Marine Reserves (SMR) provide the *greatest level of protection* to species and to ecosystems by allowing no take of any kind (with the exception of scientific take for research, restoration, or monitoring). The high level of protection created by an SMR is based on the assumption that no other appreciable level of take or alteration of the ecosystem is allowed (e.g., sewage discharge, seawater pumping, kelp harvest). In particular, SMRs provide the greatest likelihood of achieving MLPA goals 1, 2, and 4.

State Marine Parks (SMP) are designed to provide recreational opportunities and therefore can allow some or all types of recreational take of a wide variety of fish and invertebrate species by various means (e.g., hook and line, spear fishing). Because of the variety of species that potentially can be taken and the potential magnitude of recreational fishing pressure, *SMPs that allow recreational fishing provide low protection and conservation value relative to other, more restrictive MPAs* (e.g., SMRs and some SMCAs). Although SMPs have lower value for achieving MLPA goals 1 and 2, they may assist in achieving other MLPA goals.

State Marine Conservation Areas (SMCA) potentially have the most variable levels of protection and conservation of the three MPA designations because they allow any combination of commercial and recreational fishing, as well as other extractive activities (e.g., kelp harvest). Coastal MPAs are most effective at protecting species with limited range of movement and close associations to seafloor habitats. Less protection is afforded to more wide-ranging, transient species like salmon and other coastal pelagics (e.g., albacore, swordfish, pelagic sharks). This has led to proposals of SMCAs that prohibit take of bottom-dwelling species, while allowing the take of transient pelagic species. However, fishing for some pelagic species, like salmon near the bottom or in relatively shallow water, increases the likelihood of taking bottom species that are targeted for protection (e.g., California halibut, lingcod, rockfishes). Rates of bycatch are particularly high in shallow water where bottom fish move close to the surface and become susceptible to the fishing gear. In addition, for recreational salmon fishing, the practice of “mooching” has a potentially higher bycatch rate than that of trolling.

Participants at a recent national conference¹ on benthic-pelagic coupling considered the nature and magnitude of interactions among benthic (bottom-dwelling) and pelagic species, and the implications of these interactions for the design of marine protected areas. At this meeting,

¹ Benthic-pelagic linkages in MPA design: a workshop to explore the application of science to vertical zoning approaches. November 2005. Sponsored by NOAA National Marine Protected Area Center, Science Institute, Monterey, CA.

scientists and recreational fishing representatives agreed that bycatch is higher in water depths <50m (164 ft) and lower in deeper water. This information, along with incidental catch statistics provided by CDFG, formed the basis of categorization of SMCAs into three relative levels of protection of bottom-dwelling species and their habitats.

SMCA High Protection – These SMCAs protect benthic communities, both directly and indirectly, and allow only the take of highly transient pelagic species. Proposed SMCAs that prohibit take of all species except salmon and coastal pelagics in water depth greater than 50m (164 ft) were placed in this category. SMCAs with High Protection are equivalent to SMRs for protecting many, but not all, species and habitats. However, our understanding of the interactions among pelagic species and the benthic community is incomplete. Moreover, salmon fishing in deep water (>50m) can be conducted near the bottom, resulting in bycatch of benthic species. Therefore these SMCAs do not have as high protection and conservation value as no-take SMRs, and are less likely to achieve MLPA goals 1,2, and 4. Moreover, SMRs are needed to evaluate the effects of SMCAs that allow the take of coastal pelagics (including salmon).

The SAT also has categorized one proposed MPA as an SMCA with high protection, rather than as an SMR, because of the negative influence of elevated temperature of the cooling water discharged from the Diablo Canyon Power Generating Station. Although thermal impact of the cooling water discharge is constrained largely to Diablo Cove and the intertidal environment roughly 1.4 miles to the north of the Cove, this is sufficient impact to warrant an SMCA-high designation².

SMCA Moderate Protection – These SMCAs protect the majority of benthic species and their habitats while allowing for the take of transient pelagics, selected benthic fishes and invertebrates, and giant kelp (hand harvested only; Appendix 2). Proposed SMCAs that prohibit take of all species except salmon, pelagic fishes, squid, crab, spot prawn, and giant kelp were placed in this category. These MPAs are considered to provide relatively lower protection than SMRs and SMCAs (High) primarily because they allow the take of species (crab, spot prawn and, to a lesser extent, squid) that have direct interaction, as predator, prey or habitat of those species targeted for protection. Thus, removal of these species can potentially affect the overall ecosystem (Goal 1) as well as particular species targeted for protection that feed on or otherwise interact with these species (Goal 2). In addition, take of crabs and spot prawns that live on the seafloor increases the likelihood of bycatch of those bottom-dwelling species that are targeted for protection (i.e. rockfishes).

Although bycatch of bottom-dwelling species in **market squid** landings is considered minimal, the presence of bycatch has been documented through CDFG's port sampling program. The port sampling program records bycatch (i.e., presence or absence evaluations), but actual amounts of bycatch have not been quantified to date. During 2004, bycatch was present in about forty-nine percent of the observed squid landings, but species that constituted bycatch were primarily other coastal pelagics. Benthic species targeted for protection by MPAs comprised a very small

² Issues and environmental impacts associated with once-through cooling at California's coastal power plants. 2005. California Energy Commission, CEC-700-2005-013. Sacramento, CA. 81 pp + Appendices.

component of the squid fishery (CDFG³). Spawning squid occur near the bottom when attaching their egg masses directly onto sand sediment. Occurrence of squid as bycatch in bottom trawls also indicates their presence on or near the bottom and their co-occurrence with benthic species.

The magnitude of bycatch in the commercial **spot prawn** trap fishery⁴ was quantified from a CDFG observer program in 2000-2001. In central California (Pt. Conception to Monterey Bay), an average of about 150 pounds of bottom-dwelling fish was taken with every 1000 pounds of spot prawns. Thirty species of finfish were observed as bycatch in the spot prawn trap fishery. The top five species, in decreasing frequency of occurrence, were sablefish, rosethorn rockfish, greenblotched rockfish group (includes greenblotched, greenspotted, and pink rockfish), spotted cusk eel, and filetail catshark, comprising 78% of all fishes in the catch (by weight). Observed bycatch included seventeen species of rockfishes. Sea stars constituted the vast majority of invertebrates taken as bycatch. Other invertebrates included red rock crab, a large sea slug, galatheid crab, urchin, octopus, box crab, hermit crab, decorator crab, brittle star, feather star, and sea cucumber. Most invertebrates and many fish species, other than rockfishes, could be returned to the water alive.

Bycatch associated with the **Dungeness crab** trap fishery has not been documented. Although some fishes associated with sand sediments are likely caught in this fishery, other crabs (mostly rock crab) are the only species reported in Dungeness crab landings⁵.

SMCA Low Protection – These SMCAs protect some benthic species and their habitats. These proposed SMCAs allow various forms of commercial and recreational fishing and kelp harvesting. Both the directed take and potential bycatch from those fisheries will greatly limit the conservation value of these MPAs relative to SMRs and SMCAs of high and moderate protection. Also, mechanical harvest of giant kelp and the harvest of bull kelp by any method result in both direct and indirect take of many invertebrate and fish species (Appendix 2). As such, these SMCAs are least likely to assist in achieving MLPA goals 1, 2, and 4.

III. Description of Habitat Protection by Subregions Within Proposed Packages

The relative amount of protection afforded to 20 different habitat types by each of the five packages within the entire study region and within each of the seven subregions was evaluated using the SAT levels of protection assigned to each MPA (i.e., SMR, SMCA-High, SMCA-Moderate, SMCA-Low, and SMP), the amount of habitats available in each subregion, and the amount of habitats protected within the proposed MPAs. The estimated area (or linear extent) of habitat in each proposed MPA was divided by the estimated area (or linear extent) of each habitat available in each subregion. These proportions were summed across MPAs of similar protection level within a subregion to estimate percentage of habitat protected at each level

³ table 7b P. Reilly's information (need proper citation)

⁴ Reilly, P.N. and J. Geibel. 2002. Results of California Department of Fish and Game Spot Prawn Trawl and Trap Fisheries Bycatch Observer Program 2000-2001. Report prepared for the California Fish and Game Commission (July 2002).

⁵ Table on crab landings; need proper citation from Paul R.

within each sub-region for each package. The following comments are based on our interpretations of Figure 3a-e.

Package: 0**Subregion 1:** Pigeon Point to Capitola

Comments: Most habitats are poorly protected. To achieve MLPA Goals 1 and 4, more MPAs of higher protection level would be needed.

Subregion 2: Capitola to Monterey

Comments: Coastal marsh, tideflats, eelgrass, and estuarine habitats are highly protected. Most other habitats are poorly protected. To better achieve MLPA Goals 1 and 4, more MPAs of higher protection level would be needed.

Subregion 3: Monterey to Point Sur

Comments: Shoreline and nearshore (0-30 m) rock and kelp habitats would receive a high level of protection from the proposed MPAs. About 4% of nearshore sand habitats are in MPAs with a high level of protection. There are no SMR or SMCA-High MPAs proposed in habitats greater than 100 m.

Subregion 4: Point Sur to Cape San Martin

Comments: Two to seven percent of shoreline and nearshore sand, rock, and kelp habitats would receive a high level of protection from the proposed MPAs. There are no SMR or SMCA-High MPAs proposed for habitats greater than 100 m deep, and habitats deeper than 30 m are poorly represented. There is only one SMR.

Subregion 5: Cape San Martin to Point Estero

Comments: None of the fifteen habitats in this region are protected in any form of MPA.

Subregion 6: Point Estero to Santa Maria River

Comments: The only proposed MPAs are SMCA-Low and provide only limited protection for those species living on sand bottom habitats.

Subregion 7: Santa Maria River to Point Conception

Comments: The only MPA is a small SMR in the very southern portion. It protects only four habitat types: sand beach, nearshore sand, rocky intertidal, and nearshore rock habitats. Those habitats are protected at levels of 6%, 4%, 21%, and 0.2% of available habitat, respectively.

Package: 1**Subregion 1:** Pigeon Point to Capitola

Comments: This package includes high protection of four shoreline habitats. The remaining available habitats (i.e., kelp, sand and rock 0-100 m) receive little (<4%) protection from the proposed MPAs. To better achieve MLPA Goals 1 and 4, additional MPAs would be needed or

existing MPAs would need to be extended into these habitats. There is no deep (>100 m) sand or rock habitat in this subregion.

Subregion 2: Capitola to Monterey

Comments: Estuarine habitats would be highly protected. Sand, rock, and canyon habitats deeper than 200 m also would receive a high level of protection. The sand and rock areas from 30 - 200 m would receive a lower level of protection. Limiting the allowed extractive activities in MPAs with these habitats would increase level of protection. Almost no sandy beaches are protected.

Subregion 3: Monterey to Point Sur

Comments: Shoreline and nearshore sand, rock, and kelp habitats would receive a high level of protection. There are no SMR or SMCA-High MPAs proposed in habitats greater than 100 m. Deep-water habitats are represented in MPAs, but at a lower level of protection (SMCA-Moderate). Limiting the allowed extractive activities in proposed MPAs with deep-water habitats would increase level of protection.

Subregion 4: Point Sur to Cape San Martin

Comments: Shoreline and nearshore sand, rock, and kelp habitats would receive a high level of protection. There are no SMR or SMCA High-MPAs proposed in habitats greater than 100 m deep. Deep-water habitats are represented in MPAs, but at a lower level of protection (SMCA-Moderate). Limiting the allowed extractive activities in proposed MPAs with deep-water habitats would increase level of protection.

Subregion 5: Cape San Martin to Point Estero

Comments: Shoreline and nearshore (0-30 m) sand, rock, and kelp habitats would receive a high level of protection. All other available habitats would receive a low level of protection, but there is little deep-water habitat in the area. To better achieve MLPA Goals 1 and 4, more MPAs of higher protection levels would be needed.

Subregion 6: Point Estero to Santa Maria River

Comments: Shoreline, coastal marsh, tideflat, and nearshore (0-30 m) sand, rock, and kelp habitats would receive a high level of protection. A large proportion of the estuarine and eelgrass habitats are protected. About 8% of estuarine habitat is protected at a high level, and 73% at a low level. All other available habitats would receive a low level of protection. There is little or no deep sand, rock, or canyon habitat in this subregion. To better achieve MLPA Goals 1 and 4, more MPAs of higher protection level would be needed to protect available habitats.

Subregion 7: Santa Maria River to Point Conception

Comments: Shoreline, tideflat, estuarine, and nearshore sand and rock habitats would receive a high level of protection. The 30-100 m deep sand habitats would receive a low level of protection. All other available habitats would receive a low level or no protection. To better achieve MLPA Goals 1 and 4, more MPAs of higher protection level would be needed. There is no deep (>100 m) sand or rock habitat in this subregion.

Package: 2

Subregion 1: Pigeon Point to Capitola

Comments: This package includes high protection of three shoreline habitats. Little of the remaining six available habitats in the region are protected at high levels (SMR or SMCA-High). To better achieve MLPA Goals 1 and 4, additional MPAs would be needed to protect these habitats, or existing MPAs would need to extend protection in deep (0-100 m) sand and rock habitats. There is no deep (>100 m) sand or rock habitat in this subregion.

Subregion 2: Capitola to Monterey

Comments: Estuarine and marsh habitats would be highly protected. Sand and rock habitats deeper than 100 m, and canyon habitats deeper than 200 m would also receive a high level of protection. Other available habitats are less protected. Limiting the allowed extractive activities in proposed MPAs would increase level of protection in these other habitats. Almost no sandy beaches are protected in this subregion.

Subregion 3: Monterey to Point Sur

Comments: Shoreline and nearshore (0-30 m deep) sand, rock, and kelp habitats would receive a high level of protection. Shallow canyon habitats (0-30 m) are particularly well protected. Sand and rock habitats from 30-100 m deep are less well protected. There are no SMR or SMCA-High MPAs proposed in habitats greater than 100 m. Deep-water habitats are represented in MPAs, but at a lower level of protection (SMCA-Moderate). Limiting the allowed extractive activities in proposed MPAs with deep-water habitats would increase level of protection.

Subregion 4: Point Sur to Cape San Martin

Comments: All available habitats in this region are well protected by the proposed MPAs.

Subregion 5: Cape San Martin to Point Estero

Comments: Shoreline and nearshore (0-30 m) sand, rock, and kelp habitats would receive a high level of protection, as would sand and rock habitats out to 100 m deep. All other habitats would receive a lower level of protection, but there is little deep-water habitat in this subregion.

Subregion 6: Point Estero to Santa Maria River

Comments: Shoreline, coastal marsh, tideflats, estuarine, and nearshore (0-30 m) rock and kelp habitats would receive a high level of protection from the proposed MPAs. Sand habitats 0-30 m deep are less protected. Sand and rock habitats out to 200 m deep are well protected. There is little or no deep sand, rock, or canyon habitat in this subregion.

Subregion 7: Santa Maria River to Point Conception

Comments: All available habitats in this subregion are well protected. There is no deep (>100 m) sand or rock habitat in this subregion.

Package: 3

Subregion 1: Pigeon Point to Capitola

Comments: This package includes high protection of the three shoreline habitats and coastal marsh. Nearshore sand and rock habitats out to 100 m are less protected. Kelp habitats are also less well protected. Few other habitats exist in this subregion.

Subregion 2: Capitola to Monterey

Comments: Estuarine, tideflat, and marsh habitats are well protected. None of the sandy beach, and little of the sand habitat out to 100 m deep, are protected. Sand and rock habitats greater than 100 m deep, and canyon habitats deeper than 200 m are well protected. Canyon habitats less than 200 m deep are less protected, as are rock habitats less than 30 m deep.

Subregion 3: Monterey to Point Sur

Comments: Shoreline and nearshore (0-30 m deep) sand, rock, and kelp habitats would receive a high level of protection. Shallow canyon habitats (0-30 m) are particularly well protected. Sand and rock habitats from 30-100 m deep are less protected. There are no SMR or SMCA-High MPAs proposed in habitats greater than 100 m. Deep habitats are represented in MPAs, but at a lower level of protection (SMCA-Moderate). Limiting the allowed extractive activities in proposed MPAs with deep-water habitats would increase level of protection.

Subregion 4: Point Sur to Cape San Martin

Comments: All available habitats in this region are well protected by the proposed MPAs.

Subregion 5: Cape San Martin to Point Estero

Comments: Shoreline and nearshore (0-30 m) sand, rock, and kelp habitats would receive a high level of protection from the proposed MPAs. Sand and rock habitats greater than 30 m deep would receive less protection, particularly those in areas deeper than 100 m. All other habitats would receive a lower level of protection from the proposed MPAs, but there is little estuarine or deep-water habitat in the area.

Subregion 6: Point Estero to Santa Maria River

Comments: Coastal marsh, tideflats, eelgrass, estuarine, nearshore (0-30 m deep) rocky, and kelp habitats are well protected. Rocky intertidal, and especially sandy beach habitats are less protected. All sand and rock habitats in deep (30-200 m deep) waters are much less protected. There is little to no deeper sand, rock, or canyon habitat in this subregion.

Subregion 7: Santa Maria River to Point Conception

Comments: Shoreline habitats are well protected in this subregion. Estuarine and tidal flat habitats are not well protected. Available sand habitats are well protected. Available rock habitat is less well protected. There is no deep (>100 m) sand or rock habitat in this subregion.

Package: AC

Subregion 1: Pigeon Point to Capitola

Comments: This package includes high protection of three shoreline habitats and coastal marshes. Kelp and available nearshore and deeper rock habitats are well protected. Available sand habitats are less protected. There is no deep (>100 m) sand or rock habitat in this subregion.

Subregion 2: Capitola to Monterey

Comments: Estuarine and marsh habitats in this subregion would be highly protected. Sand and rock habitats deeper than 100 m, and canyon habitats deeper than 200 m would also receive a high level of protection. Other available habitats are less protected. None of the sandy beaches, rocky intertidal, kelp, or nearshore (0-30 m) rocky habitats are protected in this subregion.

Subregion 3: Monterey to Point Sur

Comments: Shoreline and nearshore (0-30 m deep) sand, rock, and kelp habitats would receive a high level of protection. Shallow canyon habitats (0-30 m) are particularly well protected. Sand and rock habitats from 30-100 m deep are less protected. There are no SMR or SMCA-High MPAs proposed in habitats greater than 100 m; these habitats are represented in MPAs, but at a lower level of protection (SMCA-Moderate). Limiting the allowed extractive activities in proposed MPAs with deep-water habitats would increase level of protection.

Subregion 4: Point Sur to Cape San Martin

Comments: All available habitats in this region are well protected by the proposed MPAs.

Subregion 5: Cape San Martin to Point Estero

Comments: Shoreline and nearshore (0-30 m) sand habitats would receive a high level of protection from proposed MPAs. Rock habitats (0-100 m) are well protected. Kelp and sand habitats 30-100 m deep are less protected. Sand and rock habitats >100 m are not protected. Estuarine habitat is well protected, but coastal marsh and tideflat habitats are less protected.

Subregion 6: Point Estero to Santa Maria River

Comments: Rocky intertidal, coastal marsh, tideflats, eelgrass, estuarine, and nearshore (0-30 m) rock and kelp habitats would receive a high level of protection. Sand beaches and sand habitats 0-30 m deep are less protected. Sand and rock habitats (0-200 m) are well protected. There is little to no deeper sand, rock, or canyon habitat in this subregion.

Subregion 7: Santa Maria River to Point Conception

Comments: All available habitats in this subregion are well protected, except for estuarine and tideflat habitats. There is no deep (>100 m) sand or rock habitat in this subregion.

IV. Comparison Among Proposed Packages by Habitat Types and Subregions

Levels of protection of select habitats were compared among the five packages. We selected eight key habitats (shallow [0-100 m depth] and deep [>100 m depth] rock and sand, estuary, intertidal rock, sand beach, and kelp) and compared levels of protection across the five packages (1) for the entire study region (Figure 4), and (2) for each of the seven subregions. The

following is our interpretation of the comparison of the five proposed packages in terms of these eight habitats across subregions.

Habitat: Sand Beach

1. There is substantial (20-43 linear miles) sandy beach habitat in all subregions.
2. Each of the four new packages, as compared to status quo (i.e., package 0), proposes increased protection of sand beach habitat in all subregions, with the exception of subregion 2.
3. In subregion 2, sand beach habitat is not protected by any of the packages.
4. Sand beach habitat is well protected (9-59% in SMR or SMCA-high) in all four new packages in subregions 3,4,5, and 7.
5. Sand beach habitat in subregion 6 (total: 43 linear miles) is less protected (4-8%) in all packages.

Habitat: Rocky Intertidal

1. There is substantial (28-50 linear miles) intertidal rock habitat in all subregions, except for subregion 2 (only 0.2 linear miles).
2. Each of the four new packages, as compared to status quo (i.e., package 0), proposes increased protection of intertidal rock habitat in the six subregions with this type of habitat.
3. All four new packages propose SMR or SMCA-high protection for 9-47% of intertidal rock habitat in subregions 1,3,4,5, 6, and 7.

Habitat: Estuary

1. There is estuarine habitat, regardless of amount, in each of the seven subregions.
2. Each of the four new packages, as compared to status quo (i.e., package 0), proposes increased protection of estuarine habitat in four of the seven subregions.
3. Elhorn Slough, Moro Cojo Slough, and Morro Bay estuary are the only estuaries of any size in the entire study region and serve as important nursery grounds and adult feeding and spawning habitats for many marine and estuarine fishes. The four new packages afford highest level of protection (SMR) to 100% of estuary habitat in subregion 2, which includes Elhorn and Moro Cojo Sloughs. The four packages afford SMR protection to 7% (package 1) and >25% (packages 2,3,AC) of estuaries in subregion 6 (includes Morro Bay).
4. Across the entire study region, package 2 includes the greatest amount of protection to estuarine habitat.

Habitat: Shallow Sand (0-100 m depth)

1. There is substantial shallow sand habitat in all subregions.
2. Each of the four new packages, as compared to status quo (i.e., package 0), proposes increased protection of this habitat in all seven subregions.
3. None of the packages afford this habitat type >5% of relatively high (SMR or SMCA-high) levels of protection in subregions 1 and 2, with the exception of package AC in subregion 1.
4. Package 2 protects the highest amount of this habitat within the study region.

5. In subregion 3, which has the least amount of this habitat type (total: $<50 \text{ mi}^2$), none of the packages put $>8\%$ of the habitat in high protection MPAs.
6. Despite 160 mi^2 of this habitat in subregion 6, only packages 2 (13%) and AC (8%) afford relatively high (SMR and SMCA-high) protection.

Habitat: Deep Sand ($>100 \text{ m}$ depth)

1. There is no deep sand habitat in subregions 1 and 7. Subregions 5 and 6 have relatively small amounts of this habitat.
2. Each of the four new packages, as compared to status quo (i.e., package 0), proposes increased protection of this habitat in subregions 2-4, which have the highest amounts of this habitat.
3. There is relatively little deep sand habitat in subregion 5 and it is poorly protected in all packages.
4. Across the entire study region, packages 2 and AC include the greatest amount of protection to deep sand habitat.

Habitat: Shallow rock (0-100 m depth)

1. There is shallow rock habitat in all subregions. Subregion 2 (including Monterey Bay) has substantially less (8 mi^2) shallow rock habitat relative to the other subregions.
2. Each of the four new packages, as compared to status quo (i.e., package 0), proposes increased protection of this habitat in all subregions.
3. In subregion 1, only package AC provides high protection (i.e. SMR and SMCA-high) to $>3\%$ of this habitat.
4. Although subregion 2 has a relatively small amount of this habitat, none of the packages provide high level of protection to $>5\%$ of this habitat. Of note, much of this shallow rock habitat is in close proximity to ports at either end of subregion 2.
5. The amount of this type of habitat having high protection varies widely in subregions 4 and 7. Specifically, in subregion 4, packages 2 and AC include $>40\%$ of this habitat in high protection, package 3 includes 24%, and package 1 includes $<11\%$. In subregion 7, packages 1 and 3 include 5-7% in high protection, while packages 2 and AC each protect 42% of this habitat at the high level.
6. Across the entire study region, package 1 protects less than half of the shallow rock habitat that is protected by all other packages.

Habitat: Deep rock ($>100 \text{ m}$ depth)

1. Only subregions 2 and 3 have substantial amounts of this habitat. There is no deep rock habitat in subregions 1 and 7, and there is relatively little of this habitat south of Point Sur (subregions 4-7).
2. Each of the four new packages, as compared to status quo (i.e., package 0), proposes increased protection of this habitat in subregions 2-4.
3. There is relatively little deep rock habitat in subregion 5 and it is poorly protected in all packages.
4. Although subregion 3 has second greatest amount of this habitat within the study region, none of the packages provide high-level protection.
5. In subregion 6, which also has relatively little deep rock habitat, only packages 2 (63%) and AC (11%) provide protection of this habitat at any level.

6. Across the entire study region, package 1 provides high-level protection to <4% of this habitat, compared to the other three packages (>14% of habitat).

Habitat: Kelp

1. There is kelp habitat in all seven subregions.
2. No package proposes protection to the small amount of kelp habitat (total: 0.1 mi²) in subregion 2.
3. Each of the four new packages, as compared to status quo (i.e., package 0), proposes increased protection of kelp habitat in five subregions.
4. All four new packages propose SMR or SMCA-high protection for 7-50% of kelp habitats in subregions 3-6, and at least SMCA-moderate protection for at least 5% of kelp in subregion 1.
5. While kelp is 3% of all habitats in subregion 7, only package 2 (95% in SMR) and AC (16% in SMR) provide any protection of this habitat.

NOTE: We have not yet discussed submarine canyon and headland habitats in terms of protections by the packages. This will be added to the next draft.

V. Summary

We were asked to provide an evaluation of how well each of the proposed MPA packages achieves the statutory requirements of MLPA goals one and four. To evaluate the packages, we first reviewed the information provided by the proponents for each proposed MPA. We then identified levels of protection afforded by each proposed MPA, based on our knowledge of the habitats and species in the proposed MPAs and the types and magnitudes of impacts that we expect would be created by the proposed allowable activities in each MPA. The next step in our analysis included an evaluation of the habitats available in each of seven subregions in the central coast study region, and the percentage of habitats protected by packages in each subregion. We used the percentage of habitat protected as the primary tool to determine the levels of habitat representation and protection for each package. These analyses provided quantitative estimates of the amount of habitats protected in all habitats, depths, and subregions of the central coast study area. This subregion approach provided an indication of how well proposed packages protect representative marine habitats (Goal 4) in central California. Table 1 provides a summary of the occurrence of 5%, 10%, 15%, and 20%, respectively, of the available habitat (covering at least an area of 0.25 square miles or linear extent of 1 mile) for selected habitats in each subregion of the central coast study region. *******NOTE: Does the SAT want to recommend a minimum percentage of habitat coverage that would needed to achieve the requirements of MLPA Goal 4? We should have this discussion on Jan 20*****.**

Scientific models have been developed to provide estimates of the amount of protection needed to protect the diversity and abundance of some habitats and species. There is, however, scientific debate about how much of a particular habitat or combination of habitats is needed to protect a community of species, and preserve the structure and function of ecosystem (MLPA Goal 1). The level of risk that a society is willing to accept is an important concept in the determination of the amount of habitat necessary to achieve MLPA Goal 1, as is an

understanding of the magnitude of existing human alterations to biological communities and habitats. Table 1 provides a summary that is useful in addressing protection levels relevant to MLPA Goal 1. *******NOTE: Does the SAT want to recommend a minimum or maximum percentage of habitat coverage that would needed to achieve the requirements of MLPA Goal 1? We should have this discussion on Jan 20*****.**

Appendix 1a. Summary of SAT assessment and rationale of protection level for individual proposed MPAs in **Package 0** (existing MPAs).

MPA Name: Ano Nuevo Special Closure

Allowed/ Disallowed Uses: Take of invertebrates is not allowed between Nov 30 and April 30

Proposed Designation: SMCA

SAT Protection Level: SMCA-Low

Rationale for SAT Designation: Allows commercial and recreational take of benthic species.

MPA Name: Elkhorn Slough State Marine Reserve

Allowed/ Disallowed Uses: No take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Hopkins State Marine Reserve

Allowed/ Disallowed Uses: No Take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Pacific Grove State Marine Conservation Area

Allowed/ Disallowed Uses: Only the following species may be taken recreationally: finfish, and invertebrates other than mollusks or crustaceans. Only the following species may be taken commercially by ring net, lampara net, or bait net: sardines, mackerel, anchovies, squid, and herring.

Proposed Designation: SMCA

SAT Protection Level: SMCA-Low

Rationale for SAT Designation: Allows recreational take of finfish.

MPA Name: Carmel Bay State Marine Conservation Area

Allowed/ Disallowed Uses: Take of all living marine resources is prohibited except the recreational take of finfish by hook-and-line or spear and the commercial take of kelp under specific conditions.

Proposed Designation: SMCA

SAT Protection Level: SMCA-Low

Rationale for SAT Designation: Allows recreational take of finfish.

MPA Name: Point Lobos State Marine Reserve

Allowed/ Disallowed Uses: No Take
Proposed Designation: SMR
SAT Protection Level: SMR
Rationale for SAT Designation: N/A

MPA Name: Julia Pfeiffer Burns State Marine Conservation Area

Allowed/ Disallowed Uses: The following species may be taken recreationally: finfish, chiones, clams, cockles, rock scallops, native oysters, crabs, lobsters, ghost shrimp, sea urchins, mussels and marine worms (except that no worms may be taken in any mussel bed unless taken incidentally to the take of mussels). The following species may be taken commercially: finfish, crabs, ghost shrimp, jackknife clams, sea urchins, squid, kelp and worms (except that no worms may be taken in any mussel bed, nor may any person pick up, remove, detach from the substrata any other organisms, or break up, move or destroy any rocks or other substrata or surfaces to which organisms are attached).

Proposed Designation: SMCA

SAT Protection Level: SMCA-Low

Rationale for SAT Designation: Allows both commercial and recreational take of finfish..

MPA Name: Big Creek State Marine Reserve

Allowed/ Disallowed Uses: No take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A.

MPA Name: Atascadero Beach State Marine Conservation Area

Allowed/ Disallowed Uses: Take of clams is prohibited. Take of other living marine resources is allowed.

Proposed Designation: SMCA

SAT Protection Level: SMCA-Low

Rationale for SAT Designation: Allows both commercial and recreational take of finfish.

MPA Name: Morro Beach State Marine Conservation Area

Allowed/ Disallowed Uses: Take of clams is prohibited. Take of other living marine resources is allowed.

Proposed Designation: SMCA

SAT Protection Level: SMCA-Low

Rationale for SAT Designation: Allows both commercial and recreational take of finfish.

MPA Name: Pismo State Marine Conservation Area

Allowed/ Disallowed Uses: Take of clams is prohibited. Commercial take of giant kelp and bull kelp is prohibited. Take of other living marine resources is allowed.

Proposed Designation: SMCA

SAT Protection Level: SMCA-Low

Rationale for SAT Designation: Allows both commercial and recreational take of finfish.

MPA Name: Pismo-Oceano State Marine Conservation Area

Allowed/ Disallowed Uses: Take of clams is prohibited. Commercial take of giant kelp and bull kelp is prohibited. Take of other living marine resources is allowed.

Proposed Designation: SMCA

SAT Protection Level: SMCA-Low

Rationale for SAT Designation: Allows both commercial and recreational take of finfish.

MPA Name: Vandenberg State Marine Reserve

Allowed/ Disallowed Uses: No take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

Appendix 1b. Summary of SAT protection level assessments and rationale for individual proposed MPAs in **Package 1.**

MPA Name: Ano Nuevo State Marine Reserve

Allowed/ Disallowed Uses: No commercial or recreational fishing permitted, including no take of invertebrates.

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Greyhound Rock State Marine Conservation Area

Allowed/ Disallowed Uses: SMCA prohibits the take of finfish and invertebrates EXCEPT for recreational and commercial fishing for salmon, coastal pelagic species (including squid) and Dungeness crab. Recreational shore fishing regulations would remain unchanged in the SMCA. Fishing regulations within Scott and Waddell creeks shall not be affected by this MPA.

Proposed Designation: SMCA

SAT Protection Level: SMCA Low

Rationale for SAT Designation: Allows recreational take of finfish. Allows take of salmon in water depths < 50 m (164 ft). Existing kelp harvest lease.

MPA Name: Greyhound Rock State Marine Reserve

Allowed/ Disallowed Uses: No take, hand-harvest of kelp allowed.

Proposed Designation: SMR

SAT Protection Level: SMCA-Moderate

Rationale for SAT Designation: Existing lease for hand-harvested kelp.

MPA Name: Sand Hill Bluff Intertidal State Marine Reserve

Allowed/ Disallowed Uses: No take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Elkhorn Slough State Marine Reserve

Allowed/ Disallowed Uses: No take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Moro Cojo Estuary State Marine Reserve

Allowed/ Disallowed Uses: No take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Monterey Submarine Canyon No Bottom Contact State Marine Conservation Area

Allowed/ Disallowed Uses: No bottom contact or extraction of benthic species. Fishing for only salmon, highly migratory species and coastal pelagic species (including squid) is allowed. Because this water is so deep, this SMCA has a high conservation value very close to an SMR.

Proposed Designation: SMCA

SAT Protection Level: SMCA High

Rationale for SAT Designation: Allows the take of salmon and other coastal pelagics in water depths > 50 m (164 ft).

MPA Name: Monterey Canyon No-Trawl State Marine Conservation Area

Allowed/ Disallowed Uses: No trawling.

Proposed Designation: SMCA

SAT Protection Level: SMCA Low

Rationale for SAT Designation: Allows commercial and recreational take of benthic species.

MPA Name: Ed Ricketts State Marine Park

Allowed/ Disallowed Uses: SMP prohibits all spearfishing and kelp harvesting, but allows for recreational skiff and shore angling, and scientific monitoring. We have negotiated with the City of Monterey to support limiting fishing from the breakwater to the area east of the gate, thereby reducing conflicts between fishermen and novice divers in the area closest to the beach. This would require CDFG Commission approval.

Proposed Designation: SMP

SAT Protection Level: SMP Low

Rationale for SAT Designation: N/A

MPA Name: Ed Ricketts State Marine Conservation Area

Allowed/ Disallowed Uses: SMCA prohibits take of all marine life EXCEPT for kelp harvesting, recreational hook & line fishing for finfish and recreational spearfishing for halibut and highly migratory species. No take for scientific or educational purposes is allowed.

Proposed Designation: SMCA

SAT Protection Level: SMCA Low

Rationale for SAT Designation: Allows recreational take of finfish.

MPA Name: Hopkins State Marine Reserve

Allowed/ Disallowed Uses: No take allowed

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Pacific Grove – Monterey State Marine Conservation Area

Allowed/ Disallowed Uses: SMCA prohibits commercial take of finfish and benthic invertebrates EXCEPT Dungeness crab, salmon, coastal pelagic species (including squid), herring and kelp. Recreational fishing is allowed for finfish, Dungeness crab, and squid. Recreational take of other crustaceans and mollusks are prohibited.

Proposed Designation: SMCA

SAT Protection Level: SMCA Low

Rationale for SAT Designation: Allows recreational take of finfish. Allows the take of salmon and other coastal pelagics in water depths > 50 m (164 ft).

MPA Name: Pacific Grove Intertidal State Marine Reserve

Allowed/ Disallowed Uses: No Take Allowed. Would allow walk-in spearfishermen to cross the tidewater to return to shore with any fish caught outside the intertidal waters.

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Cypress Pinnacles State Marine Reserve

Allowed/ Disallowed Uses: No take allowed

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Carmel Bay State Marine Conservation Area

Allowed/ Disallowed Uses: SMCA prohibits take of all marine life EXCEPT for recreational finfish and commercial squid and kelp harvest.

Proposed Designation: SMCA

SAT Protection Level: SMCA Low

Rationale for SAT Designation: Allows recreational take of finfish. Existing lease for mechanical-harvested kelp.

MPA Name: Point Lobos State Marine Reserve

Allowed/ Disallowed Uses: No take allowed. Recommend to CDPR to modestly expand the number of day-use permits for non-consumptive divers, and to increase parking, if possible.

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Pt. Lobos State Marine Conservation Area

Allowed/ Disallowed Uses: SMCA prohibits the take of finfish and invertebrates EXCEPT for recreational and commercial fishing for salmon, and commercial fishing for spot prawns. This would be a high value SMCA.

Proposed Designation: SCMA

SAT Protection Level: SCMA Moderate

Rationale for SAT Designation: Allows the take of benthic species (i.e. spot prawns, crabs).

MPA Name: Julia Pfeiffer Burns State Marine Reserve

Allowed/ Disallowed Uses: No commercial or recreational fishing permitted, including no take of invertebrates.

Proposed Designation: SMR
SAT Protection Level: SMR
Rationale for SAT Designation: N/A

MPA Name: Julia Pfeiffer Burns State Marine Conservation Area
Allowed/ Disallowed Uses: Commercial and recreational salmon and spot prawn take only allowed.

Proposed Designation: SCMA
SAT Protection Level: SCMA Moderate
Rationale for SAT Designation: Allows the take of benthic species (i.e. spot prawns, crabs).

MPA Name: Big Creek State Marine Reserve
Allowed/ Disallowed Uses: No commercial or recreational fishing permitted, including no take of invertebrates. The area will retain its current no-entry regulations and exemptions.

Proposed Designation: SMR
SAT Protection Level: SMR
Rationale for SAT Designation: N/A

MPA Name: Alder Creek State Marine Reserve
Allowed/ Disallowed Uses: No commercial or recreational fishing permitted, including no take of invertebrates.

Proposed Designation: SMR
SAT Protection Level: SMR
Rationale for SAT Designation: N/A

MPA Name: Alder Creek State Marine Conservation Area
Allowed/ Disallowed Uses: Commercial and recreational salmon and coastal pelagic take only.

Proposed Designation: SMCA
SAT Protection Level: SMCA Low
Rationale for SAT Designation: Allows take of salmon in water depths < 50 m (164 ft).

MPA Name: Point Piedras Blancas State Marine Reserve
Allowed/ Disallowed Uses: No commercial or recreational fishing permitted, including no take of invertebrates.

Proposed Designation: SMR
SAT Protection Level: SMR
Rationale for SAT Designation: N/A

MPA Name: Cambria State Marine Park

Allowed/ Disallowed Uses: Recreational fishing only allowed, no commercial fishing, however, commercial shore-launched craft are permitted to transit the area.

Proposed Designation: SMP

SAT Protection Level: SMP Low

Rationale for SAT Designation: N/A

MPA Name: Morro Strand Invertebrate State Marine Conservation Area

Allowed/ Disallowed Uses: No-take of any invertebrates allowed.

Proposed Designation: SMCA

SAT Protection Level: SMCA Low

Rationale for SAT Designation: 9

MPA Name: Morro Bay Harbor State Marine Conservation Area

Allowed/ Disallowed Uses: Recreational fishing allowed. Commercial oyster farming and bait receiving allowed. No commercial fishing.

Proposed Designation: SCMA

SAT Protection Level: SCMA Low

Rationale for SAT Designation: Allows recreational take of finfish.

MPA Name: Morro Bay Harbor East State Marine Reserve

Allowed/ Disallowed Uses: No commercial or recreational fishing permitted, including no take of invertebrates

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Morro Beach Sandspit State Marine Reserve

Allowed/ Disallowed Uses: No commercial or recreational fishing permitted, including take of invertebrates.

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Diablo Canyon State Marine Reserve

Allowed/ Disallowed Uses: No commercial or recreational fishing permitted, including no take of invertebrates.

Proposed Designation: SMR

SAT Protection Level: SMCA-High

Rationale for SAT Designation: Negative thermal impact from discharge of power plant cooling waters.

MPA Name: Diablo Canyon State Marine Conservation Area

Allowed/ Disallowed Uses: Commercial and recreational salmon fishing only allowed.

Proposed Designation: SMCA

SAT Protection Level: SMCA-Low

Rationale for SAT Designation: Allows take of salmon in water depths < 50 m (164 ft).

MPA Name: Pismo-Oceano Invertebrate State Marine Conservation Area

Allowed/ Disallowed Uses: No-take of any invertebrates allowed.

Proposed Designation: SMCA

SAT Protection Level: SCMA-Low

Rationale for SAT Designation: Allows both commercial and recreational take of finfish.

MPA Name: Vandenberg State Marine Reserve

Allowed/ Disallowed Uses: No commercial or recreational fishing permitted, including take of invertebrates.

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Vandenberg Danger Zone 4 State Marine Conservation Area

Allowed/ Disallowed Uses: Commercial and recreational salmon fishing and crabbing allowed.

Proposed Designation: SMCA

SAT Protection Level: SMCA-Low

Rationale for SAT Designation: Allows take of salmon in water depths < 50 m (164 ft).

Appendix 1c. Summary of SAT protection level assessments and rationale for individual proposed MPAs in **Package 2.**

MPA Name: Gazos to Ano Nuevo State Marine Reserve

Allowed/ Disallowed Uses: No Take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Davenport State Marine Reserve

Allowed/ Disallowed Uses: No take.

Note: Site is proposed as SMR however an existing kelp bed lease may require a phasing in of this level of protection after lease has expired and can be redrawn. We propose this MPA be established as an SMCA allowing only kelp harvesting under the existing lease in any interim period.

Proposed Designation: SMR

SAT Protection Level: SMCA-Moderate

Rationale for SAT Designation: Existing lease for hand-harvested kelp.

MPA Name: Baldwin to Natural Bridges State Marine Reserve

Allowed/ Disallowed Uses: No Take

Proposed Designation: SMR

SAT Protection Level: SMCA-Moderate

Rationale for SAT Designation: Existing lease for hand-harvested kelp.

MPA Name: Opal Cliffs State Marine Conservation Area

Allowed/ Disallowed Uses: Take of all living marine resources is prohibited except the recreational take of finfish by rod and reel from shore.

Proposed Designation: SMCA

SAT Protection Level: SMCA-Low

Rationale for SAT Designation: Allows recreational take of finfish.

MPA Name: Elkhorn Slough State Marine Reserve

Allowed/ Disallowed Uses: No Take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Moro Cojo Estuary State Marine Reserve

Allowed/ Disallowed Uses: No Take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Soquel Hole State Marine Conservation Area

Allowed/ Disallowed Uses: Take of all living marine resources is prohibited except: Take of salmon and albacore and take of spot prawns by traps

Proposed Designation: SMCA

SAT Protection Level: SMCA-Moderate

Rationale for SAT Designation: Allows the take of benthic species (i.e. spot prawns, crabs).

MPA Name: Portuguese Ledge State Marine Reserve

Allowed/ Disallowed Uses: No take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: East Ed Ricketts State Marine Reserve

Allowed/ Disallowed Uses: No take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Hopkins State Marine Reserve

Allowed/ Disallowed Uses: No take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: West Ed Ricketts State Marine Reserve

Allowed/ Disallowed Uses: No take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Pacific Grove East State Marine Conservation Area

Allowed/ Disallowed Uses: In whole SMCA: Commercial take is prohibited except kelp harvesting allowed by hand harvest under harvest plan that allocates take to existing harvesters at rates approximately equal to existing take levels. No intertidal collection and no poke pole fishing allowed. No spear fishing contests allowed: Any competition involving two or more persons in which persons are ranked, or winners are determined, based on the size, weight, number of species, type of species, or number of fish taken by means of spearfishing. In area between line due west of Esplanade Street and line due west of Lover's Point. Recreational take of finfish by spear and by hook and line allowed.

Proposed Designation: SMCA

SAT Protection Level: SCMA-Low

Rationale for SAT Designation: Allows recreational take of finfish.

MPA Name: Pacific Grove West State Marine Reserve

Allowed/ Disallowed Uses: No take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Carmel Pinnacles State Marine Reserve

Allowed/ Disallowed Uses: No Take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Carmel Bay State Marine Conservation Area

Allowed/ Disallowed Uses: Take of all living marine resources is prohibited except the recreational take of finfish by hook and line or spear and the commercial take of kelp by hand harvest. No spearfishing contests allowed: Any competition involving two or more persons in which persons are ranked or winners are determined based on the size, weight, number of species, type of species, or number of fish taken by means of spearfishing.

Proposed Designation: SMCA

SAT Protection Level: SMCA-Low

Rationale for SAT Designation: Allows recreational take of finfish.

MPA Name: Point Lobos State Marine Reserve

Allowed/ Disallowed Uses: No take. Note: Current regulations at Point Lobos limiting diver access do not apply to new areas covered by this proposal.

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Point Lobos State Marine Conservation Area

Allowed/ Disallowed Uses: Take of all living marine resources prohibited except: Take of salmon and albacore and take of spot prawns by trap.

Proposed Designation: SMCA

SAT Protection Level: SMCA-Moderate

Rationale for SAT Designation: Allows the take of benthic species (i.e. spot prawns, crabs).

MPA Name: Point Sur State Marine Reserve

Allowed/ Disallowed Uses: No Take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Big Creek State Marine Reserve

Allowed/ Disallowed Uses: No Take. Note: Current regulations applying to diver access at Big Creek do not apply to new areas covered by this proposal.

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Big Creek State Marine Conservation Area

Allowed/ Disallowed Uses: Take of all living marine resources is prohibited except: spot prawn by trap and take of salmon and albacore allowed in waters greater than one mile from shore.

Proposed Designation: SMCA

SAT Protection Level: SMCA-Moderate

Rationale for SAT Designation: Allows the take of benthic species (i.e. spot prawns, crabs).

MPA Name: Piedras Blancas State Marine Reserve

Allowed/ Disallowed Uses: No take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Cambria State Marine Park

Allowed/ Disallowed Uses: No commercial take

Proposed Designation: SMP

SAT Protection Level: SMP-Low

Rationale for SAT Designation: N/A

MPA Name: Cambria State Marine Conservation Area

Allowed/ Disallowed Uses: Take of all living marine resources is prohibited except: take of salmon and albacore

Proposed Designation: SMCA

SAT Protection Level: SMCA-High

Rationale for SAT Designation: Allows the take of salmon and other coastal pelagics in water depths > 50 m (164 ft).

MPA Name: Ken Norris State Marine Reserve

Allowed/ Disallowed Uses: No take.

Note: Site is proposed as SMR however an existing kelp bed lease may require a phasing in of this level of protection after lease has expired and can be redrawn. We propose this MPA be established as an SMCA allowing only kelp harvesting under the existing lease in any interim period.

Proposed Designation: SMR

SAT Protection Level: SMCA- Low

Rationale for SAT Designation: Existing lease for mechanical-harvested kelp.

MPA Name: Estero Bluff State Marine Reserve

Allowed/ Disallowed Uses: No take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Morro Bay State Marine Conservation Area

Allowed/ Disallowed Uses: No commercial take. Mariculture allowed

Proposed Designation: SMCA

SAT Protection Level: SMCA-Low

Rationale for SAT Designation: Allows recreational take of finfish.

MPA Name: Morro Bay South State Marine Reserve

Allowed/ Disallowed Uses: No take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Morro Bay East State Marine Reserve

Allowed/ Disallowed Uses: No take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Point Buchon State Marine Reserve

Allowed/ Disallowed Uses: No take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Point Buchon State Marine Conservation Area

Allowed/ Disallowed Uses: No take of living marine resources except fishing for salmon and albacore allowed.

Proposed Designation: SMCA

SAT Protection Level: SMCA-High

Rationale for SAT Designation: Allows the take of salmon and other coastal pelagics in water depths > 50 m (164 ft).

MPA Name: Purisma Point State Marine Reserve
Allowed/ Disallowed Uses: No take
Proposed Designation: SMR
SAT Protection Level: SMR
Rationale for SAT Designation: N/A

MPA Name: Point Conception State Marine Reserve
Allowed/ Disallowed Uses: No take
Proposed Designation: SMR
SAT Protection Level: SMR
Rationale for SAT Designation: N/A

Appendix 1d. Summary of SAT protection level assessments and rationale for individual proposed MPAs in **Package 3**.

MPA Name: Ano Nuevo State Marine Reserve
Allowed/ Disallowed Uses: No take
Proposed Designation: SMR
SAT Protection Level: SMCA-Moderate
Rationale for SAT Designation: Existing lease for hand-harvested kelp.

MPA Name: Natural Bridges Intertidal State Marine Reserve
Allowed/ Disallowed Uses: No take
Proposed Designation: SMR
SAT Protection Level: SMR
Rationale for SAT Designation: N/A

MPA Name: Opal Cliffs State Marine Park
Allowed/ Disallowed Uses: No invertebrate take, shore fishing only
Proposed Designation: SMP
SAT Protection Level: SMP-Low
Rationale for SAT Designation: N/A

MPA Name: Elkhorn Slough State Marine Reserve
Allowed/ Disallowed Uses: No take
Proposed Designation: SMR
SAT Protection Level: SMR
Rationale for SAT Designation: N/A

MPA Name: Moro Cojo Estuary State Marine Reserve

Allowed/ Disallowed Uses: No take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Soquel Canyon State Marine Conservation Area

Allowed/ Disallowed Uses: Allows salmon, albacore, costal pelagics and spot prawn

Proposed Designation: SMCA

SAT Protection Level: SMCA-Moderate

Rationale for SAT Designation: Allows the take of benthic species (i.e. spot prawns, crabs).

MPA Name: Portuguese Ledge State Marine Conservation Area

Allowed/ Disallowed Uses: Allows salmon, albacore

Proposed Designation: SMCA

SAT Protection Level: SMCA-High

Rationale for SAT Designation: Allows the take of salmon and other coastal pelagics in water depths > 50 m (164 ft).

MPA Name: Ed Ricketts State Marine Reserve

Allowed/ Disallowed Uses: No take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Ed Ricketts State Marine Conservation Area

Allowed/ Disallowed Uses: Allows hand take of kelp from November through February only.
All other take prohibited

Proposed Designation: SMCA

SAT Protection Level: SMCA-Moderate

Rationale for SAT Designation: Existing lease for hand-harvested kelp.

MPA Name: Hopkins State Marine Reserve

Allowed/ Disallowed Uses: No take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Pacific Grove State Marine Conservation Area

Allowed/ Disallowed Uses: Allow hand harvest of kelp, recreational fishing, no poke pole fishing, no invertebrate collection, no spear-fishing tournaments

Proposed Designation: SMCA

SAT Protection Level: SMCA-Low

Rationale for SAT Designation: Allows recreational take of finfish.

MPA Name: Pacific Grove State Marine Reserve

Allowed/ Disallowed Uses: No take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Pinnacles State Marine Reserve

Allowed/ Disallowed Uses: No take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Carmel Bay State Marine Conservation Area

Allowed/ Disallowed Uses: Allows recreational finfish and kelp harvest, prohibits spearfishing tournaments

Proposed Designation: SMCA

SAT Protection Level: SMCA-Low

Rationale for SAT Designation: Allows recreational take of finfish. Existing lease for mechanical-harvested kelp.

MPA Name: Point Lobos State Marine Reserve

Allowed/ Disallowed Uses: No take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Point Lobos State Marine Conservation Area

Allowed/ Disallowed Uses: Allows salmon, albacore and spot prawn

Proposed Designation: SMCA

SAT Protection Level: SMCA-Moderate

Rationale for SAT Designation: Allows the take of benthic species (i.e. spot prawns, crabs).

MPA Name: Point Sure State Marine Reserve

Allowed/ Disallowed Uses: No Take

Proposed Designation: SMR
SAT Protection Level: SMR
Rationale for SAT Designation: N/A

MPA Name: Point Sur State Marine Conservation Area
Allowed/ Disallowed Uses: Salmon and albacore only
Proposed Designation: SMCA
SAT Protection Level: SMCA-High
Rationale for SAT Designation: Allows the take of salmon and other coastal pelagics in water depths > 50 m (164 ft)

MPA Name: Expanded Big Creek State Reserve
Allowed/ Disallowed Uses: No take
Proposed Designation: SMR
SAT Protection Level: SMR
Rationale for SAT Designation: N/A

MPA Name: Piedras Blancas State Marine Reserve
Allowed/ Disallowed Uses: No take
Proposed Designation: SMR
SAT Protection Level: SMR
Rationale for SAT Designation: N/A

MPA Name: Piedras Blancas State Marine Conservation Area
Allowed/ Disallowed Uses: Salmon and albacore only
Proposed Designation: SMCA
SAT Protection Level: SMCA-Low
Rationale for SAT Designation: Allows take of salmon in water depths < 50 m (164 ft).

MPA Name: Cambria State Marine Park
Allowed/ Disallowed Uses: Recreational fishing only
Proposed Designation: SMP
SAT Protection Level: SMP-Low
Rationale for SAT Designation: N/A

MPA Name: Cambria State Marine Reserve
Allowed/ Disallowed Uses: No take
Proposed Designation: SMR
SAT Protection Level: SMCA-Low
Rationale for SAT Designation: Existing lease for mechanical-harvested kelp.

MPA Name: Estero Bluff State Marine Park
Allowed/ Disallowed Uses: No invertebrate take, shore fishing only
Proposed Designation: SMP
SAT Protection Level: SMP-Low
Rationale for SAT Designation: N/A

MPA Name: Morro Bay State Marine Conservation Area
Allowed/ Disallowed Uses: Allows mariculture and recreational fishing
Proposed Designation: SMCA
SAT Protection Level: SMCA-Low
Rationale for SAT Designation: Allows recreational take of finfish.

MPA Name: Morro Bay South State Marine Reserve
Allowed/ Disallowed Uses: No take
Proposed Designation: SMR
SAT Protection Level: SMR
Rationale for SAT Designation: N/A

MPA Name: Morro Bay East State Marine Reserve
Allowed/ Disallowed Uses: No take
Proposed Designation: SMR
SAT Protection Level: SMR
Rationale for SAT Designation: N/A

MPA Name: Point Buchon State Marine Reserve
Allowed/ Disallowed Uses: No Take
Proposed Designation: SMR
SAT Protection Level: SMR
Rationale for SAT Designation: N/A

MPA Name: Point Buchon State Marine Conservation Area
Allowed/ Disallowed Uses: Allow salmon and albacore only
Proposed Designation: SMCA
SAT Protection Level: SMCA-Low
Rationale for SAT Designation: Allows take of salmon in water depths < 50 m (164 ft).

MPA Name: Point Sal State Marine Reserve
Allowed/ Disallowed Uses: No take

Proposed Designation: SMR
SAT Protection Level: SMR
Rationale for SAT Designation: N/A

MPA Name: Vandenberg State Marine Reserve
Allowed/ Disallowed Uses: No take
Proposed Designation: SMR
SAT Protection Level: SMR
Rationale for SAT Designation: N/A

Appendix 1e. Summary of SAT protection level assessments and rationale for individual proposed MPAs in **Package AC**.

MPA Name: Ano Nuevo State Marine Reserve
Allowed/ Disallowed Uses: No take
Proposed Designation: SMR
SAT Protection Level: SMCA-Moderate
Rationale for SAT Designation: Existing lease for hand-harvested kelp.

MPA Name: Ano Nuevo State Marine Conservation Area
Allowed/ Disallowed Uses: Allowed: Commercial and recreational pelagic trolling, purse seine fishing
Proposed Designation: SMCA
SAT Protection Level: SMCA-Low
Rationale for SAT Designation: Allows take of salmon in water depths < 50 m (164 ft).

MPA Name: Sand Hill Bluff State Marine Reserve
Allowed/ Disallowed Uses: No take
Proposed Designation: SMR
SAT Protection Level: SMR
Rationale for SAT Designation: N/A

MPA Name: Elkhorn Slough State Marine Reserve
Allowed/ Disallowed Uses: No take
Proposed Designation: SMR
SAT Protection Level: SMR
Rationale for SAT Designation: N/A

MPA Name: Moro Cojo State Marine Reserve
Allowed/ Disallowed Uses: No take

Proposed Designation: SMR
SAT Protection Level: SMR
Rationale for SAT Designation: N/A

MPA Name: Soquel Canyon State Marine Conservation Area
Allowed/ Disallowed Uses: Allowed: recreational and commercial salmon and albacore trolling and commercial spot prawn trapping only
Proposed Designation: SMCA
SAT Protection Level: SMCA-Moderate
Rationale for SAT Designation: Allows the take of benthic species (i.e. spot prawns, crabs).

MPA Name: Portuguese Ledge State Marine Reserve
Allowed/ Disallowed Uses: No take
Proposed Designation: SMR
SAT Protection Level: SMR
Rationale for SAT Designation: N/A

MPA Name: Monterey Shale Beds Marine Park
Allowed/ Disallowed Uses: Recreational fishing except for groundfish
Proposed Designation: SMP
SAT Protection Level: SMP-Low
Rationale for SAT Designation: N/A

MPA Name: Edward F. Ricketts State Marine Reserve
Allowed/ Disallowed Uses: No take
Proposed Designation: SMR
SAT Protection Level: SMR
Rationale for SAT Designation: N/A

MPA Name: Hopkins State Marine Reserve
Allowed/ Disallowed Uses: No take
Proposed Designation: SMR
SAT Protection Level: SMR
Rationale for SAT Designation: N/A

MPA Name: Pacific Grove State Marine Conservation Area
Allowed/ Disallowed Uses: Allowed: commercial fishing for squid, sardines, herring, anchovy, mackerel and kelp. Recreational fishing for finfish only. No intertidal harvest.
Proposed Designation: SMCA

SAT Protection Level: SMCA-Low

Rationale for SAT Designation: Allows recreational take of finfish.

MPA Name: Cypress Pinnacles State Marine Reserve

Allowed/ Disallowed Uses: No take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Carmel Bay State Marine Park

Allowed/ Disallowed Uses: Allowed: All recreational fishing except crustaceans and mollusks

Proposed Designation: SMP

SAT Protection Level: SMP-Low

Rationale for SAT Designation: N/A

MPA Name: Point Lobos State Marine Reserve

Allowed/ Disallowed Uses: No take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Point Lobos State Marine Conservation Area

Allowed/ Disallowed Uses: Allowed: salmon trolling and commercial spot prawn trapping only

Proposed Designation: SMCA

SAT Protection Level: SMCA-Moderate

Rationale for SAT Designation: Allows the take of benthic species (i.e. spot prawns, crabs).

MPA Name: Big Sur State Marine Reserve

Allowed/ Disallowed Uses: No take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Big Creek State Marine Reserve

Allowed/ Disallowed Uses: No take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Big Creek State Marine Conservation Area

Allowed/ Disallowed Uses: Allowed: salmon trolling and commercial spot prawn trapping only

Proposed Designation: SMCA

SAT Protection Level: SMCA-Moderate

Rationale for SAT Designation: Allows the take of benthic species (i.e. spot prawns, crabs).

MPA Name: Piedras Blancas State Marine Reserve

Allowed/ Disallowed Uses: No take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Cambria State Marine Park

Allowed/ Disallowed Uses: Allowed: All recreational fishing

Proposed Designation: SMP

SAT Protection Level: SMP-Low

Rationale for SAT Designation: N/A

MPA Name: Cambria State Marine Reserve

Allowed/ Disallowed Uses: No take

Proposed Designation: SMR

SAT Protection Level: SMCA-Low

Rationale for SAT Designation: Existing lease for mechanical-harvested kelp.

MPA Name: Morro Bay State Marine Reserve

Allowed/ Disallowed Uses: No take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Morro Bay South State Marine Reserve

Allowed/ Disallowed Uses: No take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Point Buchon State Marine Reserve

Allowed/ Disallowed Uses: No take

Proposed Designation: SMR

SAT Protection Level: SMCA-High

Rationale for SAT Designation: Negative thermal impact from discharge of power plant cooling waters.

MPA Name: Point Buchon State Marine Conservation Area

Allowed/ Disallowed Uses: Allowed: recreational and commercial salmon trolling.

Proposed Designation: SMCA

SAT Protection Level: SMCA-High

Rationale for SAT Designation: Allows the take of salmon and other coastal pelagics in water depths > 50 m (164 ft).

MPA Name: Pt. Sal State Marine Reserve

Allowed/ Disallowed Uses: No take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Purisima Point State Marine Reserve

Allowed/ Disallowed Uses: No take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Purisima Point State Marine Conservation Area

Allowed/ Disallowed Uses: Open to recreation fishing but closed to all other activities

Proposed Designation: SMCA

SAT Protection Level: SMCA-Low

Rationale for SAT Designation: Allows recreational take of finfish.

MPA Name: Arguello Promontory State Marine Reserve

Allowed/ Disallowed Uses: No take

Proposed Designation: SMR

SAT Protection Level: SMR

Rationale for SAT Designation: N/A

MPA Name: Boathouse State Marine Conservation Area

Allowed/ Disallowed Uses: Prohibits all activities except: recreational fishing and diving, training for search and rescue groups, and activities relating to delivery of parts to VAFB.

Proposed Designation: SMCA

SAT Protection Level: SMCA-Low

Rationale for SAT Designation: Allows recreational take of finfish.

Appendix 2. Other human activities that alter ecosystem protection and conservation value of an MPA

Kelp harvesting – Potential impacts of kelp harvesting depend on the species of kelp, the method of harvest (mechanical or hand collection), and the volume of plant material removed. For both methods, take is constrained by regulations to the upper 1.2 m (4 feet) of the forest canopy formed at the surface of the ocean. Harvest of kelp forests is targeted primarily at the giant kelp, *Macrocystis pyrifera*, and secondarily the bull kelp, *Nereocystis luetkeana*. Importantly, giant kelp is a perennial (individual plants can live multiple years), and reproduction and new growth occur at the bottom of the plant. In contrast, bull kelp is an annual (individuals live only one year), and reproduction and new growth occur at the top of the plant. In addition the gas-filled bladder responsible for keeping the bull kelp erect is located at the surface. Therefore, kelp harvesting, regardless of method, has a greater negative impact on bull kelp than on giant kelp.

Assessments of the impact of harvest (both mechanical and hand) on giant kelp suggest minimal impact to the kelp plants themselves because the plants are not removed entirely and can re-grow rapidly to replace the removed canopy. Moreover, the reproductive portion of the plant is left intact at the bottom of the plant. However, harvest near the end of the summer may result in loss of the canopy for the remainder of the growing season. Whereas the amount of harvested bull kelp is much less than that of giant kelp, no impact assessment of harvesting has been conducted for bull kelp in California. However, negative impact to individuals and populations of bull kelp is likely to be much greater than giant kelp because the reproductive and growth capacity of the plants is terminated with harvest.

Of additional, and perhaps greater, concern with the harvesting of kelp is the (1) loss of habitat provided by the forest canopy for other species, (2) loss of production of plant material that is fed on by numerous grazers and detritivores in kelp forests and other habitats where drift kelp contributes to local productivity (e.g., heads of submarine canyons and sandy beaches), and (3) take (i.e. bycatch) of other species closely associated with the canopy habitat. The two harvesting methods differ markedly with respect to these three impacts. Mechanical kelp harvest is conducted by large, specially designed vessels that remove large volumes of the forest canopy and kill many associated species of fishes and invertebrates (including many species of juvenile rockfishes). Loss of habitat and food provided by kelp canopies translates to changes in growth, survival, and reproduction of those species associated with the canopy. The coastwide impact of this mortality on juvenile rockfishes has not been assessed. However, the impact to an individual kelp forest within a proposed MPA is likely to be substantial, with the loss of large numbers (1,000's) of juveniles. Because of the impacts of mechanical kelp harvest on the well-understood role of kelp to the structure, function, and services provided by kelps to shallow reef ecosystems (Goal 1), and on many species targeted for protection (Goal 2), SMCAs that allow mechanical harvest of kelp, even if no other extractive activities are permitted, are *considered to be of low protection and conservation value*.

Impacts of hand harvest of kelp in support of the abalone mariculture industry have received less attention, in large part because of the presumed lesser impact of this method compared to mechanical harvest. The reduced impact is based in part on the lower volume of plant material removed and the likelihood that juvenile fishes are less likely to be removed with the canopy.

However, experiments by CDFG in 1977 indicated that kelp canopy removal might increase the likelihood that young-of-the-year rockfishes are consumed by opportunistic, predatory fishes such as juvenile bocaccio⁶. Repeated collection of the kelp canopy from the same area likely increases local-scale impacts on habitat and food production. Because the impacts of hand harvest on the well-understood role of kelp to the structure, function and services provided by kelps to shallow reef ecosystems (Goal 1), and on many species targeted for protection by MPAs (Goal 2) are less than the impacts from mechanical harvest, SMCAs that allow hand harvest of kelp are *considered to be moderate in their protection and conservation value*.

⁶ Houk, J.L. and K. McCleneghan. 1993. Effects of kelp canopy removal on young-of-the-year rockfish abundance, using two census methods. California Dept. Fish and Game, Administrative Report No. 93-5. 29 p